UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/702,540	10/31/2000	Jari Makinen	944-003.040	1149

4955 7590 09/09/2004

WARE FRESSOLA VAN DER SLUYS &
ADOLPHSON, LLP
BRADFORD GREEN BUILDING 5
755 MAIN STREET, P O BOX 224
MONROE, CT 06468

EXAMINER	
HAN, QI	
ART UNIT	**PAPER NUMBER**
2654	

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/702,540	Applicant(s) MAKINEN ET AL.
	Examiner Qi Han	Art Unit 2654

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 10-30* is/are rejected.

7)☒ Claim(s) *8-9* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1/19/01&5/6/02*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 1/19/2001 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered, wherein the listed reference "**3G TS 26.71 V3.0.01 3rd**"is missing.

Specification and Drawing

2. The disclosure is objected to because of the following:

a. According to the specification (see Section of Background of Invention, on page 1 and 2), Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

On page 3, line 24, the term "Abing ≅ artifact" is not descriptive in the context. It appears to be a typographical error. Appropriate correction is required.

c. On page 19, line 29, the phrase "based on of" appears to be --based on--. Appropriate correction is required.

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

d. Regarding **claim 6**, the limitation of "the fourth lag value based on a decoded long-term prediction lag value searched from an adaptive codebook associated with the non-corrupted frame preceding the corrupted frame, when said speech sequence is non-stationary" suggests searching lag value from adaptive codebook for non-stationary speech signal, which is not a commonly used approach in the art, so that applicant should clearly disclose or describe in the specification, but applicant fails to do so, since neither the section of Detailed Description (Best Mode for Carrying Out the Invention) nor Drawings specifically describes or shows the claimed terms. Even though, the same terms appears in the section of Summary of the Invention (see page 5), it is noted that the terms only repeatedly appearing in the summary and claims is not enough as being ***proper*** antecedent basis. As best understood in view of the disclosure objection, wherein the "adaptive codebook" will be conventionally interpreted as "fixed codebook" hereinafter. Appropriate correction is required.

e. Regarding **claims 1, 5, 11, 16, 21 and 26**, in the preambles, the limitation of "wherein the second long-term prediction lag values include a last long-term prediction lag value and the second long-term prediction gain values

include a last long-term prediction gain value" is unclear and/or not logically possible, because the lag value and gain value are included in the (**current**) non-corrupted frame, which means that the values, in normal situation, can not be the same values in another (**last**) frame, even using certain redundancy and/or delta difference coding techniques, so that this is not commonly used approach for speech coding in the art. At least applicant fails to specifically disclose such limitation in the specification, since neither the section of Detailed Description (Best Mode for Carrying Out the Invention) nor Drawings specifically describes or shows the claimed terms. Even though, the same terms appears in the section of Summary of the Invention (see page 4), it is noted that the terms only repeatedly appearing in the summary and claims is not enough as being ***proper*** antecedent basis. Appropriate correction is required.

2. Concerning multiple errors found in the application, the lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 11, 13, 15-16, 18, 20-21, 23, 25-26, 28 and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Shoham (US 5,699,485).

As per **claim 11**, as best understood in view of the objection (see above), Shoham discloses pitch delay modification during frame erasures (title) in a speech coder (abstract), comprising:

encoding speech signals in an encoded bit stream and decoding the encoded bit stream into synthesized speech (column 1, lines 44-46, 'speech coding (including encoding and decoding)', 'analysis-by-synthesis speech coder', 'speech decoder'; column 9, lines 50-51, 'bitstream from the encoder to the decoder'), wherein the encoded bit stream includes a plurality of speech frames arranged in speech sequences, and the speech frames include at least one corrupted frame preceded by one or more non-corrupted frames (column 3, line 61, 'frame erasure', 'corrupted frames'; column 6, line 33, 'good frame'), wherein the corrupted frame includes frame a first long-term prediction lag value and a first long-term prediction gain value (column 2, lines 14-24,'pitch period (delay)' (lag value), 'adaptive codebook gain' (long-term predication gain), and the non-corrupted frames include second long-term prediction lag values and second long-term prediction gain values (column 2, lines 14-24,'pitch period (delay)' (lag value), 'adaptive codebook gain' (long-term predication gain), and wherein the second long-term prediction lag values include a last long-term prediction lag value and the second long-term prediction gain values include a last long-term prediction gain value, and the speech sequences include stationary and non-stationary speech sequences, and a first signal is used to indicate the corrupted frame, (column 2, line 21to column 3, line 61, 'pitch period (delay)' (lag value), 'adaptive codebook gain' (long-term predication gain),

'frame erasure', 'whole or partially corrupted frame may detected'; column 6, lines 28-44, 'following a "good" frame' 'pitch delay M'; column 6, lines 4-5, 'classified as voice (periodic, corresponding to stationary) or unvoiced (aperiodic, corresponding to non-stationary)'; column 29, 'parity bit P0' (interpreted as the first signal); and TABLE 1 and TABLE 11);

a first means, responsive to the first signal, for determining whether the speech sequence in which the corrupted frame is arranged is stationary or non-stationary, and for providing a second signal indicative of said determining, (column 6, lines 2-13 and Fig.1, include a mechanism that 'the generation of a substitute excitation signal during periods of frame erasure is dependent on whether the erased frame is classified as classified as voice (periodic, corresponding to stationary) or unvoiced (aperiodic, corresponding to non-stationary)', 'the binary signal (the second signal) representing periodicity, v is determined');

a second means, responsive to the second signal, for replacing the first long-term prediction lag value in the corrupted frame with the last long-term prediction lag value when said speech sequence is stationary, and replacing the first long-term prediction lag value in the corrupted frame with a third lag value when said speech sequence is non-stationary, (column 6, lines 15-50, when 'v=1', 'the pitch delay, M, used by the adaptive codebook ...is equal to (replace with) the pitch delay of the last good frame'; column 6, line 51 to column 7, line 34; when 'v=0', 'a random number generator is used ... to generate the fixed codebook index (the third lag value)').

As per **claim 13** (depending claim 11), Shoham further discloses that the second means further replaces the first long-term prediction gain value in the corrupted frame

with a third gain value when said speech sequence is non-stationary (column 7, line 52 to column 8, line 15).

As per **claim 15** (depending claim 11), Shoham further discloses that the stationary speech sequences include voiced sequences, and the non-stationary speech sequences include unvoiced sequences (Shoham: column 6, lines 4-5, 'classified as voice (periodic, corresponding to stationary) or unvoiced (aperiodic, corresponding to non-stationary)').

As per **claim 16**, it recites a decoder. The rejection is based on the same reason described for claim 11 because the claim recites same or similar limitation(s) as claim 11.

As per **claim 18 and 20** (depending claim 16), the rejection is based on the same reason described for claims 13 and 15 respectively, because the claims 18 and 20 recite same or similar limitation(s) as claims 13 and 15 respectively.

As per **claim 21**, it recites a mobile station. The rejection is based on the same reason described for claim 11 because the claim recites same or similar limitation(s) as claim 11.

As per **claim 23 and 25** (depending claim 21), the rejection is based on the same reason described for claims 13 and 15 respectively, because the claims 23 and 25 recite same or similar limitation(s) as claims 13 and 15 respectively.

As per **claim 26**, it recites an element in a communication network. The rejection is based on the same reason described for claim 11 because the claim recites same or similar limitation(s) as claim 11.

As per **claim 28 and 30** (depending claim 16), the rejection is based on the same reason described for claims 13 and 15 respectively, because the claims 28 and 30 recite same or similar limitation(s) as claims 13 and 15 respectively.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shoham (US 5,699,485), in view of Makinen et al. (US 2002/0091523 A1), hereinafter referenced as Makinen.

As per **claim 1**, as best understood in view of the objection (see above), Shoham discloses pitch delay modification during frame erasures (title) in a speech coder (abstract), comprising:

concealing errors in an encoded bit stream indicative of speech signals received in a speech decoder (column 1, lines 44-46, 'speech coding (including encoding and decoding)', 'analysis-by-synthesis speech coder', 'speech decoder'; column 9, lines 50-51, 'bitstream from the encoder to the decoder'), wherein the encoded bit stream includes a plurality of speech frames arranged in speech sequences, and the speech frames include at least one partially corrupted frame preceded by one or more non-corrupted frames (column 3, line 61, 'frame erasure', 'corrupted frames'; column 6, line 33, 'good frame'),

wherein the partially corrupted frame includes a first long-term prediction lag value and a first long-term prediction gain value (column 2, lines 14-24,'pitch period (delay)' (lag value), 'adaptive codebook gain' (long-term predication gain), and the non-corrupted frames include second long-term prediction lag values and second long-term prediction gain values (column 2, lines 14-24,'pitch period (delay)' (lag value), 'adaptive codebook gain' (long-term predication gain), and wherein the second long-term prediction lag values include a last long-term prediction lag value, and the second long-term prediction gain values include a last long-term prediction gain value, (column 2, line 21to column 3, line 61, 'pitch period (delay)' (lag value), 'adaptive codebook gain' (long-term predication gain),'frame erasure', 'whole or partially corrupted frame may detected'; column 6, lines 28-44, 'following a "good" frame' 'pitch delay M'; TABLE 1 and TABLE 11);

providing an upper limit and a lower limit based on the second long-term prediction lag values (column 29, lines 6-34, 'the received adaptive codebook index is used to find ... the pitch delay (the lag value)', including using parameters 'T_1, T_2 , P_1, P_2, t_{min} and t_{max}' and other constant boundaries (limits) which corresponds to the clamed "a upper limit and a lower limit"; column 32, lines 39-44, 'the value T_2 is derived ... using this new value of T_1');

determining whether a long-term prediction lag value is within or outside the upper and lower limits (column 29, lines 6-34, the process of finding pitch delay shows the condition tests for determining whether or not the pitch delay is in the limited boundaries; column 21, lines 9-67, 'search boundaries $t_{min,}$ and t_{max}'; column 32, and lines 39-44, as described in above step);

replacing the first long-term prediction lag value in the partially corrupted frame with a third lag value, when the first long-term prediction lag value is outside the upper and lower limits (column 32, lines 39-44, 'the delay value T_1 is set to (replaced with) the value of the delay of the previous frame').

But, Shoham does not expressly disclose above determining step for **the first** long-term prediction lag value (a pitch delay in a corrupted frame) and "retaining the first long-term prediction lag value in the partially corrupted frame when the first long-term prediction lag value is within the upper and lower limits". However, this feature is well known in the art as evidenced by Makinen who discloses spectral parameter substitution for the frame error concealment in a speech decoder (Title), providing a substitution for the parameters of a bad (corrupted) frame (paragraph 21); teaches that the criterion is in essence a threshold used to distinguish between a corrupted frame that is usable and on that is not; and suggests use of possible corrupted parameters, such as corrupted LTP lag values (paragraphs 65-66), which is necessary to determining an acceptable range (limits or thresholds) for the lag value. Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Shoham by specifically providing determining an acceptable LTP lag value in a corrupted frame and using it for the corrupted frame as taught by Makinen, for the purpose of increasing speech quality for a decoder system (Makinen: abstract).

As per **claim 2** (depending claim 1), Shoham in view of Makinen further discloses replacing the first long-term prediction gain value in the partially corrupted frame with a third gain value, when the first long-term lag value is outside the upper and lower limits, (Shoham: column 32, lines 30-65, 'the concealment strategy has to reconstruct the current

frame, based on previously received information', including 'the long-term prediction gain'; column 33, lines 28-40, 'attenuation of adaptive and fixed codebook gains').

5. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shoham in view of Makinen as applied to claim 1 above, and further in view of Sasaki (US 6,377,915 B1).

As per **claim 3** (depending claim 1), even though Shoham in view of Makinen further discloses that the third lag value is calculated based the second long-term prediction lag values, (Shoham: column 32, lines 30-65, 'the delay set value T_1 is set to the value of the delay of the previous frame (second long-term predication lag value), The value of T_2 is derived with the procedure outlined in Subsection III.4.1.2, using this new value of T_1', which comprises the limits), Shoham in view of Makinen does not expressly disclose using "an adaptively-limited random lag jitter bound by further limits determined based on the second long-term prediction lag values". However, this feature is well known in the art as evidenced by Sasaki who discloses speech decoding using mix ratio table (title), comprising using a relative-limited (interpreted as "adaptively-limited") random jitter (inherently has bound(s) since both the previous pitch and the random number in the equation has bounds) for determining a pitch period (equivalent to lag value) of the aperiodic frame (column 25, lines 60-67 and column 30, lines 32-53). Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Shoham in view of Makinen by specifically providing a relative-limited random jitter for determining a pitch period, as taught by Sasaki, for the

purpose of effectively utilizing the limited frequency resource (Sasaki: column 13, lines 9-10).

As per **claim 4** (depending on claim 2), even though Shoham in view of Makinen discloses determining the gain value (the third gain value) based on the gain value (second long-term prediction gain value) of previous frame and using an attenuation factor (so that the gain would be adaptively-limited, which includes bound(s)) (Shoham: column 7, line 52 to column 8, line 15), Shoham in view of Makinen does not expressly disclose a random gain jitter bound by limits determined based on the second long-term prediction gain values. However, concept of using a pitch (lag) related parameter with random jitter bound is well known in the art as evidenced by Sasaki who discloses speech decoding using mix ratio table (title), comprising using a relative-limited (interpreted as "adaptively-limited") random jitter (inherently has bound(s) since both the previous pitch and the random number in the equation have bounds) for determining a pitch period (equivalent to lag value) of the aperiodic frame (column 25, lines 60-67 and column 30, lines 32-53), and the gain in synchronism with the pitch period, so that the gain has a nature of the random jitter having bound. Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Shoham in view of Makinen by specifically providing a gain having nature of the random jitter with bound or providing a separate random gain jitter with bound in the similar way of obtaining the random pitch jitter value, as taught by Sasaki, for the purpose of effectively utilizing the limited frequency recourse (Sasaki: column 13, lines 9-10).

6. Claims 5-7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shoham in view of Paulus et al. (0-7803-3192-3/96 IEEE, "16 kbit/s wideband speech coding based on unequal subbands", Acoustic, Speech, and Signal Processing, page 255-258 vol.1) hereinafter referenced Paulus, and further in view of Makinen.

As per **claim 5**, as best understood in view of the objection (see above), Shoham discloses pitch delay modification during frame erasures (title) in a speech coder (abstract), comprising:

concealing errors in an encoded bit stream indicative of speech signals received in a speech decoder (column 1, lines 44-46, 'speech coding (including encoding and decoding)', 'analysis-by-synthesis speech coder', 'speech decoder'; column 9, lines 50-51, 'bitstream from the encoder to the decoder'), wherein the encoded bit stream includes a plurality of speech frames arranged in speech sequences, and the speech frames include at least one corrupted frame preceded by one or more non-corrupted frames (column 3, line 61, 'frame erasure', 'corrupted frames'; column 6, line 33, 'good frame'), wherein the corrupted frame includes a first long-term prediction lag value and a first long-term prediction gain value (column 2, lines 14-24,'pitch period (delay)' (lag value), 'adaptive codebook gain' (long-term predication gain), and the non-corrupted frames include second long-term prediction lag values and second long-term prediction gain values (column 2, lines 14-24,'pitch period (delay)' (lag value), 'adaptive codebook gain' (long-term predication gain), and wherein the second long-term prediction lag values include a last to long-term prediction lag value, and the second long-term prediction gain values include a last long-term prediction gain value and the speech sequences include stationary and non-stationary speech sequences, and wherein the corrupted frame can be a totally

corrupted frame or a partially corrupted frame, (column 2, line 21to column 3, line 61, 'pitch period (delay)' (lag value), 'adaptive codebook gain' (long-term predication gain), 'frame erasure', 'whole or partially corrupted frame may detected'; column 6, lines 28-44, 'following a "good" frame' 'pitch delay M'; column 6, lines 4-5, 'classified as voice (periodic, corresponding to stationary) or unvoiced (aperiodic, corresponding to non-stationary); and TABLE 1 and TABLE 11);

replacing the first long-term prediction lag value in the corrupted frame with a third lag value if the corrupted frame is totally corrupted, (column 32, lines 39-44, 'the delay value T_1 is set to (replaced with) the value of the delay of the previous frame');

But, Shoham does not expressly disclose determining whether the corrupted frame is partially corrupted or totally corrupted. However, this feature is well known in the art as evidenced by Paulus who discloses bit error concealment using 2 parity-bit per frame, one for LP-coefficients and one for LTP-index of the first subframe (page 257, left column, paragraphs 3-5), so that whether the corrupted frame is partially corrupted or totally corrupted can be determined. Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Shoham by specifically providing a mechanism to determining a corrupted frame is partially corrupted or totally corrupted, as taught by Paulus, for the purpose of reducing the sensitivity of the decoder to random bit error (Paulus: page 257, left column, paragraph 3).

Further, Shoham in view of Paulus does not expressly disclose replacing the first long-term prediction lag value in the corrupted frame with a fourth lag value if the corrupted frame is partially corrupted. However, this feature is well known in the art as evidenced by Makinen who discloses spectral parameter substitution for the frame error

concealment in a speech decoder (Title), providing a substitution for the parameters of a bad (corrupted) frame (paragraph 21); teaches that the criterion is in essence a threshold used to distinguish between a corrupted frame that is usable and on that is not; and suggests use of possible corrupted parameters, such as corrupted LTP lag values (paragraphs 65-66). In addition, Makinen also suggests using different criteria to distinguish between a corrupted frame that is usable (partial corrupted) and one that is not (totally corrupted) (paragraphs 62-66). Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Shoham in view of Paulus by specifically providing replacing LTP lag value in a partially corrupted frame, as taught by Makinen, with some limits and conditions as taught by Shoham (column 29, lines 5-34), for the purpose of increasing speech quality for a decoder system (Makinen: abstract).

As per **claim 6** (depending claim 5), as best understood in view of the objection (see above), Shoham in view of Paulus in view of Makinen further discloses:

determining whether the speech sequence in which the partially corrupted frame is arranged is stationary or non-stationary (Shoham: column 6, lines 4-5, 'classified as voice (periodic, corresponding to stationary) or unvoiced (aperiodic, corresponding to non-stationary; Makinen: paragraphs 63 and 66, 'decide whether the decoded speech sequence has a stationary or non-stationary characteristic');

setting the fourth lag value equal to the last long-term prediction lag value, when said speech sequence is stationary (Shoham: column 32, lines 30-65, 'the delay set value T_1 is set to the value of the delay of the previous frame'); and

determining the fourth lag value based on a decoded long-term prediction lag value searched from an [adaptive] codebook associated with the non-corrupted frame preceding the corrupted frame, when said speech sequence is non-stationary (column 33, lines 43 to column line 10, 'the current frame is considered to be nonperiodic (non-stationary) … the fixed codebook contribution is generated by randomly selecting a codebook index and sign index').

As per **claim 7** (depending claim 5), Shoham in view of Paulus in view of Makinen further discloses:

determining whether the speech sequence in which the totally corrupted frame is arranged is stationary or non-stationary, (Shoham: column 6, lines 4-5, 'classified as voice (periodic, corresponding to stationary) or unvoiced (aperiodic, corresponding to non-stationary; Makinen: paragraphs 63 and 66, 'decide whether the decoded speech sequence has a stationary or non-stationary characteristic');

setting the third lag value equal to the last long-term prediction lag value, when said speech sequence is stationary, (Shoham: column 32, lines 30-65, 'the delay set value T_1 is set to the value of the delay of the previous frame'); and

determining the third lag value based on the second long-term prediction values and an adaptively-limited random lag fitter, when said speech sequence is non-stationary, (Shoham: column 32, lines 30-65, 'the delay set value T_1 is set to the value of the delay of the previous frame (second long-term predication lag value), The value of T_2 is derived with the procedure outlined in Subsection III.4.1.2, using this new value of T_1', which comprises further limits that corresponds to claimed limitation; and column 33, lines 43 to column line 10, 'the current frame is considered to be nonperiodic (non-

stationary) … the fixed codebook contribution is generated by randomly selecting a codebook index and sign index).

As per **claim 10** (depending claim 5), Shoham in view of Paulus in view of Makinen further discloses that the stationary speech sequences include voiced sequences, and the non-stationary speech sequences include unvoiced sequences (Shoham: column 6, lines 4-5, 'classified as voice (periodic, corresponding to stationary) or unvoiced (aperiodic, corresponding to non-stationary); Makinen: paragraphs 43-44 and 49).

7. Claims 12, 14, 17, 19, 22, 24, 27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shoham as applied to claim 11 above, and further in view of Sasaki (US 6,377,915).

As per **claim 12** (depending on claim 11), even though Shoham discloses determining the lag value (the first lag) in the corrupted frame can be based on the value (second long-term prediction lag value) of previous frame (column 32, lines 39-44), Shoham does not expressly disclose using "an adaptively-limited random lag jitter" for determining the lag value. However, this feature is well known in the art as evidenced by Sasaki who discloses speech decoding using mix ratio table (title), comprising using a relative-limited (interpreted as adaptively-limited) random jitter for determining a pitch period (equivalent to lag value) of the aperiodic frame (column 25, lines 60-67 and column 30, lines 32-53). Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Shoham by specifically providing a relative-limited random jitter for determining a pitch period, as taught by Sasaki, for the

purpose of effectively utilizing the limited frequency resource (Sasaki: column 13, lines 9-10).

As per **claim 14** (depending on claim 13), even though Shoham discloses determining the gain value (the third gain value) based on the gain value (second long-term prediction gain value) of previous frame and using an attenuation factor (so that the gain would be adaptively-limited) (column 7, line 52 to column 8, line 15), Shoham does not expressly disclose the gain factor being **random gain jitter**. However, concept of making a pitch (lag) related parameter being random jitter is well known in the art as evidenced by Sasaki who discloses speech decoding using mix ratio table (title), comprising using a relative-limited (interpreted as adaptively-limited) random jitter (pitch jitter value) for determining a pitch period (equivalent to lag value) of the aperiodic frame (column 25, lines 60-67 and column 30, lines 32-53), and the gain in synchronism with the pitch period, so that the gain also has nature of the random jitter. Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Shoham by specifically providing a gain having nature of the random jitter or providing a separate random gain jitter in the similar way of obtaining the random pitch jitter value, as taught by Sasaki, for the purpose of effectively utilizing the limited frequency recourse (Sasaki: column 13, lines 9-10).

As per **claim 17** (depending claim 16) **and 19** (depending claim 18), the rejection is based on the same reason described for claims 12 and 14 respectively, because the claims 17 and 19 recite same or similar limitation(s) as claims 12 and 14 respectively.

As per **claim 22** (depending claim 21) **and 24** (depending claim 23), the rejection is based on the same reason described for claims 12 and 14 respectively, because the claims 22 and 24 recite same or similar limitation(s) as claims 12 and 14 respectively.

As per **claim 27** (depending claim 26) **and 29** (depending claim 28), the rejection is based on the same reason described for claims 12 and 14 respectively, because the claims 27 and 29 recite same or similar limitation(s) as claims 12 and 14 respectively.

Allowable Subject Matter

8. Claims 8-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance:

Regarding **claim 8** (depending on claim 5), the prior art of record fail to specifically disclose or fairly suggest the limitations:

wherein the not corrupted (second) long-term prediction lag values further include a second last long-term prediction lag value and a third last long-term prediction lag value, and the second long-term prediction gain values further include a second last long-term prediction gain value and a third last long-term prediction gain value, said method further comprising the steps of:

determining minLag, which is the smallest lag value among the second long-term prediction lag values;

determining maxLag, which is the largest lag value among the second long-term prediction lag values;

determining meanLag, which is an average of the second long-term prediction lag values;

determining difLag, which is the difference of maxLad and minLag;

determining minGain, which is the smallest gain value among the second long-term prediction gain values;

determining maxGain, which is the largest gain value among the second long-term prediction gain values; and

determining meanGain, which is an average of the second long term gain values; wherein

if difLag < 10, and minLag < the fourth lag value < maxLag + 5; or

if the last long-term prediction gain value is larger than 0.5, and the second last long term prediction gain value is larger than 0.5, and the fourth lag value is smaller than a sum of the last long-term prediction value and 10, and a sum of the fourth lag value and is larger than the last long-term prediction value; or

if minGain < 0.4, and the last long-term prediction gain value is equal to minGain, and the fourth lag value is larger than minLag but smaller than maxLag; or

if difLag < 70, and the fourth lag value is larger than minLag but smaller than maxLag; or

if the fourth lag value is larger than meanLag but smaller than maxLag; then the corrupted frame is determined as partially corrupted.

Regarding **claim 4**, the prior art of record fail to specifically disclose or fairly suggest that when the speech sequence is non-stationary, to determining a frame-error rate of the encoded speech frames such that if the frame-error rate reaches a determined

value, the lag value in the partially corrupted is determined based on a decoded long-term prediction lag value searched from an adaptive codebook associated with the non-corrupted frame preceding the corrupted frame, and if the frame-error rate is smaller than the determined value, setting the lag value equal to the last long-term prediction lag value.

The prior art, Shoham (US 5,699,485), Makinen et al. (US 2002/0091523 A1), Paulus et al. (0-7803-3192-3/96 IEEE), Sasaki (US 6,377,915), of record provided numerous teachings of decoding speech signal, detecting error frame, identifying voiced/unvoiced (stationary/ non-stationary) speech, determining totally or partially corrupted frame, and variety of concealing and replacing approaches. However, the features as presented above are not anticipated by, nor made obvious over the prior art of the record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

9. Any response to this action should be mailed to:

Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

or faxed to:

(703) 872-9306, (for formal communications intended for entry)

Or:

(703) 872-9306, (for informal or draft communications, and please label "PROPOSED" or "DRAFT")

Patent Correspondence delivered by hand or delivery services, other than the USPS, should be addressed as follows and brought to U.S. Patent and Trademark Office, 220 20th Street S., Customer Window, Crystal Plaza Two, Lobby, Room 1B03, Arlington, VA, 22202

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Qi Han whose telephone numbers is (703) 305-5631. The examiner can normally be reached on Monday through Thursday from 9:00 a.m. to 7:00 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil, can be reached on (703) 305-6954.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Inquiries regarding the status of submissions relating to an application or questions on the Private PAIR system should be directed to the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028 between the hours of 6 a.m. and midnight Monday through Friday EST, or by e-mail at: ebc@uspto.gov. For general information about the PAIR system, see http://pair-direct.uspto.gov.

QH/qh
August 26, 2004

RICHEMOND DORVIL
SUPERVISORY PATENT EXAMINER